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UNITED STATES DEPARTMENT OF THE INTERIOR

NATIONAL PARK SERVICE

CRATER LAKE NATIONAL PARK

USE OF OIL IN PINE BEETLE CONTROL PROVES SUCCESSFUL ON CRATER LAKE NATIONAL PARK PROJECT

DEVELOPED BY CRATER LAKE NATIONAL PARK INSECT CONTROL STAFF IN CONJUNCTION WITH THE BUREAU OF ENTOMOLOGY.

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New, more effective and cheaper methods of killing pine beetles are constantly being sought by entomologists and foresters who have to deal with these destructive timber pests. Once in a while, some improvement in method is discovered which opens up very promising possibilities of either making substantial savings in the cost of this work or in more effectively disposing of the bugs themselves. Such promising possibilities have recently been opened up through the use of oil as a fuel in burning insect infested trees.

Spotting revealed, this spring at Crater Lake, that the reduction of infested trees in normal units, consisting of lodgepole and western white pine, after one season's control work was 80.3 per cent. In several densely forested units, the reduction after one season's work was found to be only 53.1 per cent. Although the solar heat method has been most successful in the past, it was obvious that a variation was necessary to handle these shaded units.

The use of oil in burning standing infested trees in the Yellowstone region suggested that some such method might be adapted to the local problem. Experiments were conducted by Entomologist F. P. Keen, and W. J. Buckhorn, of the Bureau of Entomology and Mr. Frank Solinsky, in charge of the insect control work in the Park. After many trials with different oils, equipment and methods of application, the following method was evolved and put into practice.

The burning equipment best adapted to the purpose consisted of a five back pack pump, similar to the standard water pump required for fire protection, fitted with a three foot extension and a nozzle designed to vary the character of the oil stream. Several five gallon cans were necessary for the transportation of oil to replenish the pump. Ordinary fuel oil with a gravity of 27 plus was found to be the most satisfactory both from the standpoint of slowness of burning and cost (about $5\frac{1}{4}$ cents per gallon).

The trees were first felled in such a position as to be above the ground and clear of all brush and timber. They were then limbed, the top cut off at the end of the infestation, and thus prepared for burning. A small fire was then started on the base of the log; a spray stream of oil directed against it and the fire carried up on one side of the bole and down the other. The tree was then given a quarter turn and the top and bottom treated in a similar way. One man with a shovel followed the burner and extinguished any fire that dropped to the ground. By never allowing any ground fire to start, the escape of fire and scorching of nearby trees was entirely avoided. Within five or ten minutes, the operation was complete, every spark was dead and the beetles killed. The bark was not burned but merely scorched. White ash margins on the bark scales was the criterion of an adequately burned tree.

The size of the crew is dependent on conditions as they are encountered. It may vary from three to five men with fallers and burners making up the personnel.

The cost of burning varied from 68 cents to $1.05 per tree, depending upon the thickness of the ground cover, the extra fire precautions which had to be taken, the distance from the oil supply and the ability of the crew to adapt the method to each particular situation. The total cost of burning 1547 trees was $1,434.07 or $0.927 per tree.

The amount of oil used varied from one half to one and one quarter gallons per tree with three quarters of a gallon the average for the burning.

The advantages of the method are the complete kill of the broods, avoidance of fire damage to adjacent timber and comparative low cost. Any other method of treatment of the units burned (solar heat excepted -- not practical) would have cost upwards of two dollars a tree.

Various modifications of oil burning open up numerous other possibilities. Oil burning has been used on standing trees, but with indifferent success due to the proximity of the lodgepole and the resultant scorching. Oil burning has been found to be successful on the mountain hemlock, infested with scolytus bark beetles. Experiments with oil burning were tried on large, thick barked yellow pine (Pinus Ponderosa) infested with the western pine beetle. By proportionately increasing the amount of oil applied, the bark and cambium layer became terrifically hot, killing all of the beetles in and under the bark. The results were so successful and the cost so greatly reduced over the old hand peeling and burning that this method should find an important place in the control of the western pine beetle.

Starting the burning. The size of the flame can be varied by the pressure applied by the hand pump. Note the mixture of hemlock and lodgepole in the background.

One side of the tree has been burned and the burner is now treating the other side. The two fallers of this three man crew have taken up shovels and are extinguishing fire that has dropped to the ground.

Burned trees in a dense forest. Note how the trees have been felled in piles raising them off the ground. Trees are burned in succession and as fast as one is treated, it is used as a bed for another.

This picture clearly illustrates the adverse conditions which faced the burning. Thick brush, deep duff, heavy reproduction and a dense forest all increased the fire hazard, yet not a fire got away, nor was a tree scorched. Note how the burned tree in the foreground is hardly blackened, yet the kill of the brood was complete.